

What is claimed is:

1. A cell search method of performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said method comprising steps of:
 - determining correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;
 - detecting peak values from said correlation value profile and peak timings at the time the peak values have been obtained to detect spreading timings of base stations;
 - identifying spreading codes that differ for each base station and that are used by base stations for which spreading timings have been detected;
 - performing a path search process using the detected spreading timings and the spreading codes that differ for each base station and that have been identified to detect peak timings at the time multipath occurs;
 - generating an autocorrelation pattern with the center at the obtained spreading timing of a base station and autocorrelation patterns with the center at the peak timings at the time multipath occurs, based on an autocorrelation pattern that has been found in advance from said spreading code shared among base stations;
 - subtracting each of said generated autocorrelation

patterns from said correlation value profile; and
searching for a next base station from the
correlation value profile that has undergone said subtraction.

5 2. A cell search method of performing a base station
search to identify spreading timings of a plurality of base
stations located in the vicinity of a mobile station and
spreading codes used by the base stations and differing for
each base station, said method comprising steps of:

10 determining correlation values between received
signals and a spreading code shared among base stations to
determine a correlation value profile;

 detecting peak values from said correlation value
profile and peak timings at the time the peak values have been
15 obtained to detect spreading timings of base stations;

 identifying spreading codes that differ for each base
station and that are used by base stations for which spreading
timings have been detected;

 performing a path search process using the detected
20 spreading timings and the spreading codes that differ for each
base station and that have been identified to detect peak
timings at the time multipath occurs;

 generating autocorrelation patterns with the center
at the obtained spreading timing of a base station based on an
25 autocorrelation pattern that has been found in advance from
said spreading code shared among base stations;

subtracting said generated autocorrelation patterns
and peak values caused by multipath from said correlation
value profile; and

searching for a next base station from the
5 correlation value profile that has undergone said subtraction.

3. A cell search method of performing a base station
search to identify spreading timings of a plurality of base
stations located in the vicinity of a mobile station and
10 spreading codes used by the base stations and differing for
each base station, said method comprising steps of:

determining correlation values between received
signals and a spreading code shared among base stations to
determine a correlation value profile;

15 detecting peak values from said correlation value
profile and peak timings at the time the peak values have been
obtained to detect spreading timings of base stations;

identifying spreading codes that differ for each base
station and that are used by base stations for which spreading
20 timings have been detected;

generating autocorrelation patterns with the center
at the obtained spreading timing of a base station based on an
autocorrelation pattern that has been found in advance from
said spreading code shared among base stations;

25 subtracting said generated autocorrelation pattern
from said correlation value profile; and

searching for a next base station from the correlation value profile that has undergone said subtraction.

4. A cell search method of performing a base station
- 5 search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said method comprising steps of:
- 10 determining correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;
- detecting peak values from said correlation value profile and peak timings at the time the peak values have been obtained to detect spreading timings of base stations;
- 15 identifying spreading codes that differ for each base station and that are used by base stations for which spreading timings have been detected;
- performing a path search process using the detected spreading timings and the spreading codes that differ for each
- 20 base station and that have been identified to detect peak timings at the time multipath occurs;
- generating autocorrelation patterns with the center at a peak timings at the time multipath occurs, based on an autocorrelation pattern that has been found in advance from
- 25 said spreading code shared among base stations;
- subtracting said generated autocorrelation patterns

from said correlation value profile; and

searching for a next base station from the correlation value profile that has undergone said subtraction.

- 5 5. A cell search method of performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said method comprising steps of:
- 10 determining correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;
- detecting peak values from said correlation value profile and peak timings at the time the peak values have been
- 15 obtained to detect spreading timings of base stations;
- identifying spreading codes that differ for each base station and that are used by base stations for which spreading timings have been detected;
- performing a path search process using the detected
- 20 spreading timings and the spreading codes that differ for each base station and that have been identified to detect peak timings at the time multipath occurs;
- subtracting peak values caused by multipath from said correlation value profile; and
- 25 searching for a next base station from the correlation value profile that has undergone said subtraction.

6. A cell search method of performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and
5 spreading codes used by the base stations and differing for each base station, said method comprising steps of:

determining correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;

10 detecting peak values from said correlation value profile and peak timings at the time the peak values have been obtained to detect spreading timings of base stations;

identifying spreading codes that differ for each base station and that are used by base stations for which spreading
15 timings have been detected;

performing a path search process using the detected spreading timings and the spreading codes that differ for each base station and that have been identified to detect peak timings at the time multipath occurs;

20 performing a process of masking said correlation value profile such that timings of an autocorrelation pattern with the center at the detected spreading timing and the timings of an autocorrelation pattern with the center at the peak timing at which a multipath is present are not subject to
25 a cell search; and

searching for a next base station from the

correlation value profile that has undergone the masking process.

7. A cell search method of performing a base station
- 5 search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said method comprising steps of:
- 10 determining correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;
- detecting peak values from said correlation value profile and peak timings at the time the peak values have been obtained to detect spreading timings of base stations;
- 15 identifying spreading codes that differ for each base station and that are used by base stations for which spreading timings have been detected;
- performing a path search process using the detected spreading timings and the spreading codes that differ for each
- 20 base station and that have been identified to detect peak timings at the time multipath occurs;
- performing a process of masking said correlation value profile such that timings of an autocorrelation pattern with the center at the detected spreading timing and peak
- 25 timings at the time multipath occurs are not subject to a cell search; and

searching for a next base station from the correlation value profile that has undergone the masking process.

- 5 8. A cell search method of performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said method comprising steps of:
- 10 determining correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;
- detecting peak values from said correlation value profile and peak timings at the time the peak values have been
- 15 obtained to detect spreading timings of base stations;
- identifying spreading codes that differ for each base station and that are used by base stations for which spreading timings have been detected;
- performing a process of masking said correlation
- 20 value profile such that timings of an autocorrelation pattern with the center at the detected spreading timing are not subject to a cell search; and
- searching for a next base station from the correlation value profile that has undergone the masking
- 25 process.

9. A cell search method of performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said method comprising steps of:

determining correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;

detecting peak values from said correlation value profile and peak timings at the time the peak values have been obtained to detect spreading timings of base stations;

identifying spreading codes that differ for each base station and that are used by base stations for which spreading timings have been detected;

performing a path search process using the detected spreading timings and the spreading codes that differ for each base station and that have been identified to detect peak timings at the time multipath occurs;

performing a process of masking said correlation value profile such that timings of an autocorrelation pattern with the center at the peak timing at which a multipath is present are not subject to a cell search; and

searching for a next base station from the correlation value profile that has undergone the masking process.

10. A cell search method of performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for
5 each base station, said method comprising steps of:

determining correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;

10 detecting peak values from said correlation value profile and peak timings at the time the peak values have been obtained to detect spreading timings of base stations;

identifying spreading codes that differ for each base station and that are used by base stations for which spreading timings have been detected;

15 performing a path search process using the detected spreading timings and the spreading codes that differ for each base station and that have been identified to detect peak timings at the time multipath occurs;

performing a process of masking said correlation
20 value profile such that peak timings at the time multipath occurs are not subject to a cell search; and

searching for a next base station from the correlation value profile that has undergone the masking process.

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11. A method according to claim 6, wherein said step of

performing a process of masking said correlation value profile includes a step of masking each of the timings that are the object of masking in chip units.

5 12. A method according to claim 7, wherein said step of performing a process of masking said correlation value profile includes a step of masking each of the timings that are the object of masking in chip units.

10 13. A method according to claim 8, wherein said step of performing a process of masking said correlation value profile includes a step of masking each of the timings that are the object of masking in chip units.

15 14. A method according to claim 9, wherein said step of performing a process of masking said correlation value profile includes a step of masking each of the timings that are the object of masking in chip units.

20 15. A method according to claim 10, wherein said step of performing a process of masking said correlation value profile includes a step of masking each of the timings that are the object of masking in chip units.

25 16. A method according to claim 6, wherein said step of performing a process of masking said correlation value profile

includes a step of masking fixed regions in one or a plurality of locations that include timings that are the object of masking.

17. A method according to claim 7, wherein said step of
5 performing a process of masking said correlation value profile includes a step of masking fixed regions in one or a plurality of locations that include timings that are the object of masking.

18. A method according to claim 8, wherein said step of
10 performing a process of masking said correlation value profile includes a step of masking fixed regions in one or a plurality of locations that include timings that are the object of masking.

19. A method according to claim 9, wherein said step of
15 performing a process of masking said correlation value profile includes a step of masking fixed regions in one or a plurality of locations that include timings that are the object of masking.

20. A method according to claim 10, wherein said step
20 of performing a process of masking said correlation value profile includes a step of masking fixed regions in one or a plurality of locations that include timings that are the object of masking.

21. A cell search device for performing a base station
25 search to identify spreading timings of a plurality of base

stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said device comprising:

5 a correlator for detecting correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;

10 peak detection means for detecting peak values from said correlation value profile and peak timings at which the peak values have been obtained to successively detect spreading timings of base stations;

means for identifying spreading codes that differ for each base station and that are used by said base stations for which spreading timings have been detected;

15 means for performing a path search process using spreading timings that have been detected and said spreading codes that differ for each base station and that have been identified to detect peak timings at the time multipath occurs; and

20 subtraction means for, based on an autocorrelation pattern that has been found in advance by means of a spreading code shared among said base stations, generating autocorrelation patterns that center on spreading timings of base stations that have been obtained and autocorrelation patterns with the center at a peak timings at the time
25 multipath occurs, and that performs a process for subtracting each of said generated autocorrelation patterns from said

correlation value profile.

22. A cell search device for performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said device comprising:
- a correlator for detecting correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;
 - peak detection means for detecting peak values from said correlation value profile and peak timings at which the peak values have been obtained to successively detect spreading timings of base stations;
 - means for identifying spreading codes that differ for each base station and that are used by said base stations for which spreading timings have been detected;
 - means for performing a path search process using spreading timings that have been detected and said spreading codes that differ for each base station that have been identified to detect peak timings at the time multipath occurs; and
 - subtraction means that, based on an autocorrelation pattern that has been found in advance by means of a spreading code shared among said base stations, generating autocorrelation patterns that center on spreading timings of base stations that have been obtained and that

performs a process for subtracting said generated autocorrelation patterns and peak values that are caused by multipath from said correlation value profile.

5 23. A cell search device for performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said device comprising:

10 a correlator for detecting correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;

 peak detection means for detecting peak values from said correlation value profile and peak timings at which
15 the peak values have been obtained to successively detect spreading timings of base stations;

 means for identifying spreading codes that differ for each base station and that are used by said base stations for which spreading timings have been detected; and

20 subtraction means that, based on an autocorrelation pattern that has been found in advance by means of a spreading code shared among said base stations, generating autocorrelation patterns that center on spreading timings of base stations that have been obtained and that
25 performs a process for subtracting said generated autocorrelation patterns from said correlation value profile.

24. A cell search device for performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said device comprising:
- a correlator for detecting correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;
 - peak detection means for detecting peak values from said correlation value profile and peak timings at which the peak values have been obtained to successively detect spreading timings of base stations;
 - a means for identifying spreading codes that differ for each base station and that are used by said base stations for which spreading timings have been detected;
 - means for performing a path search process using spreading timings that have been detected and said spreading codes that differ for each base station that have been identified to detect peak timings at the time multipath occurs; and
 - subtraction means that, based on an autocorrelation pattern that has been found in advance by means of a spreading code shared among said base stations, generating autocorrelation patterns with the center at a peak timings at the time multipath occurs and that performs a process for subtracting said generated autocorrelation patterns

from said correlation value profile.

25. A cell search device for performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said device comprising:
- a correlator for detecting correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;
 - peak detection means for detecting peak values from said correlation value profile and peak timings at which the peak values have been obtained to successively detect spreading timings of base stations;
 - a means for identifying spreading codes that differ for each base station and that are used by said base stations for which spreading timings have been detected;
 - means for performing a path search process using spreading timings that have been detected and said spreading codes that differ for each base station that have been identified to detect peak timings at the time multipath occurs; and
 - subtraction means that performs a process for subtracting peak values that are caused by multipath from said correlation value profile.

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26. A cell search device for performing a base station

search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said device comprising:

5 correlator for detecting correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;

peak detection means for detecting peak values from said correlation value profile and peak timings at which
10 the peak values have been obtained to successively detect spreading timings of base stations;

means for identifying spreading codes that differ for each base station and that are used by said base stations for which spreading timings have been detected;

15 means for performing a path search process using spreading timings that have been detected and said spreading codes that differ for each base station that have been identified to detect peak timings at the time multipath occurs; and

mask processing means that performs a process of
20 masking said correlation value profile such that the timings of autocorrelation patterns that center on the spreading timings that have been detected and the timings of autocorrelation patterns with the center at a peak timings at the time multipath occurs are not the targets of a cell search.

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27. A cell search device for performing a base station

search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said device comprising:

- 5 a correlator for detecting correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;
- peak detection means for detecting peak values from said correlation value profile and peak timings at which
- 10 the peak values have been obtained to successively detect spreading timings of base stations;
- a means for identifying spreading codes that differ for each base station and that are used by said base stations for which spreading timings have been detected;
- 15 means for performing a path search process using spreading timings that have been detected and said spreading codes that differ for each base station that have been identified to detect peak timings at the time multipath occurs; and
- mask processing means that performs a process of
- 20 masking said correlation value profile such that the timings of autocorrelation patterns that center on the spreading timings that have been detected and peak timings at the time multipath occurs are not the targets of a cell search.

- 25 28. A cell search device for performing a base station search to identify spreading timings of a plurality of base

stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said device comprising:

5 a correlator for detecting correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;

peak detection means for detecting peak values from said correlation value profile and peak timings at which the peak values have been obtained to successively detect
10 spreading timings of base stations;

means for identifying spreading codes that differ for each base station and that are used by said base stations for which spreading timings have been detected;

mask processing means that performs a process of
15 masking said correlation value profile such that the timings of autocorrelation patterns that center on the spreading timings that have been detected are not the targets of a cell search.

29. A cell search device for performing a base station
20 search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and spreading codes used by the base stations and differing for each base station, said device comprising:

a correlator for detecting correlation values
25 between received signals and a spreading code shared among base stations to determine a correlation value profile;

peak detection means for detecting peak values from said correlation value profile and peak timings at which the peak values have been obtained to successively detect spreading timings of base stations;

5 means for identifying spreading codes that differ for each base station and that are used by said base stations for which spreading timings have been detected;

means for performing a path search process using spreading timings that have been detected and said spreading
10 codes that differ for each base station that have been identified to detect peak timings at the time multipath occurs; and

mask processing means that performs a process of masking said correlation value profile such that the timings of autocorrelation patterns with the center at a peak timings at
15 the time multipath occurs are not the targets of a cell search.

30. A cell search device for performing a base station search to identify spreading timings of a plurality of base stations located in the vicinity of a mobile station and
20 spreading codes used by the base stations and differing for each base station, said device comprising:

a correlator for detecting correlation values between received signals and a spreading code shared among base stations to determine a correlation value profile;

25 peak detection means for detecting peak values from said correlation value profile and peak timings at which

the peak values have been obtained to successively detect spreading timings of base stations;

a means for identifying spreading codes that differ for each base station and that are used by said base stations for which
5 spreading timings have been detected;

means for performing a path search process using spreading timings that have been detected and said spreading codes that differ for each base station that have been identified to detect peak timings at the time multipath occurs; and

10 mask processing means that performs a process of masking said correlation value profile such that the peak timings at the time multipath occurs are not the targets of a cell search.

15 31. A device according to claim 26, wherein said mask processing means masks each of the timings that are the object of masking in chip units.

20 32. A device according to claim 27, wherein said mask processing means masks each of the timings that are the object of masking in chip units.

25 33. A device according to claim 28, wherein said mask processing means masks each of the timings that are the object of masking in chip units.

34. A device according to claim 29, wherein said mask processing means masks each of the timings that are the object of masking in chip units.

5 35. A device according to claim 30, wherein said mask processing means masks each of the timings that are the object of masking in chip units.

10 36. A device according to claim 26, wherein said mask processing means masks fixed areas in one or a plurality of locations that include timings that are the object of masking.

15 37. A device according to claim 27, wherein said mask processing means masks fixed areas in one or a plurality of locations that include timings that are the object of masking.

20 38. A device according to claim 28, wherein said mask processing means masks fixed areas in one or a plurality of locations that include timings that are the object of masking.

39. A device according to claim 29, wherein said mask processing means masks fixed areas in one or a plurality of locations that include timings that are the object of masking.

25 40. A device according to claim 30, wherein said mask processing means masks fixed areas in one or a plurality of

locations that include timings that are the object of masking.

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